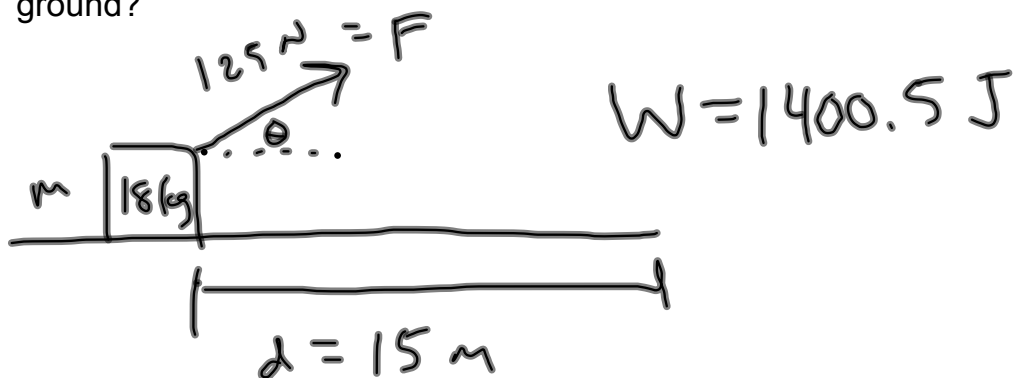


Work Energy Problems and Power Notes 4.5.12 Honors Physics

A rope attached to an 18.0 kg crate is pulled with 125.0 N at a certain angle from a frictionless surface. The crate is dragged 15.0 meters along the ground, and it takes 1400.5 J to accomplish the pull. What angle is the rope being pulled, relative to the ground?



$$W = F d \cos \theta$$

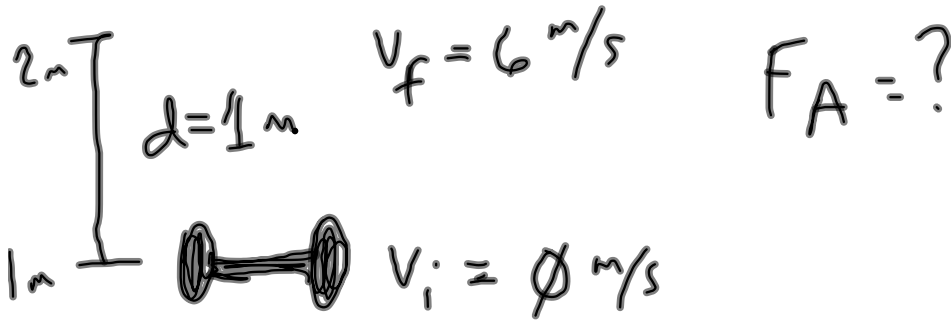
$$\theta = \cos^{-1} \left[\frac{W}{F d} \right]$$

$$= \cos^{-1} \left[\frac{1400.5 \text{ J}}{(125 \text{ N})(15 \text{ m})} \right]$$

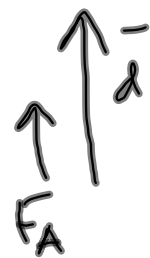
$$= 41.7^\circ$$

Work Energy Problems and Power Notes 4.5.12 Honors Physics

A 5 kg dumbbell is lifted from rest straight up from a height of 1 m to a height of 2 m. If the velocity of the dumbbell is 6 m/s at 2 m, what is the applied force necessary to raise the dumbbell?



$$\theta = 0^\circ$$



$$W = \Delta K + \Delta U_g$$

$$F_A d \cos \theta = \frac{1}{2} m (v_f^2 - v_i^2) + m a_g (h_f - h_i)$$

$$F_A = \frac{1}{d} \left[\frac{1}{2} m v_f^2 + m a_g (h_f - h_i) \right]$$

$$= \frac{1}{(1 \text{ m})} \left[\frac{1}{2} (5 \text{ kg}) (6 \text{ m/s})^2 + (5 \text{ kg}) (9.8 \text{ m/s}^2) (2 \text{ m} - 1 \text{ m}) \right]$$

$$= 139 \text{ N}$$